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Feasibility of Developing Up-Cycled Products Using Plastic Waste For the Sri Lankan Market

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Abstract

Proper waste management and therefore, waste disposal is a huge problem in Sri Lanka. Waste generation increases with the increase of the gross domestic production. As a result, more plastic packaging waste are added to the mounting waste dumps around the country. There are many recycling methods that use up a considerable amount of energy and water. Waste up-cycling using low-cost machines can be a better alternative to the conventional methods. As such, the aim of this study was to explore the feasibility of developing upcycled products using plastic waste for the Sri Lankan market.

In the first stage of the study, a number of designs were developed and sketched on paper based on the initial needs assessment. Then different waste materials were selected for production where the matrix material is a waste plastic. Thirdly, materials were processed using a low-cost laminating press that heats on both plates. These laminated materials are used to make the final product. A series of upcycled products are developed incorporating locally available materials to obtain a better quality product. In the second stage of the study, a market analysis using a detailed questionnaire is underway to assess a number of key parameters – 1. Acceptance for up-cycled products from waste, 2. Willingness to buy, 3. Available markets and 4. End-of life disposal mechanisms. Prototype products are shown as examples to provide an idea of the production possibilities.

The initial results indicate that there is a potential and feasibility to develop useful products using waste materials using low-cost machines. All upcycled products are developed using clean plastic packaging waste sourced from different industries. The plastic types used are LDPE, HDPE and PP. Other local fibre materials available as waste such as banana fibre, paper and textile waste are used as the reinforcement. The process does not use any chemical additives and binds the materials only by using heat and pressure. Based on the initial discussions with industries, designers, and marketers, different paths to sell the upcycled products are identified. Further analysis that is underway will also take into consideration the energy consumption of this method compared to the conventional recycling methods, time spent to produce one unit and the cost per unit. The final practical outcome of the study is to nucleate low-cost waste upcycling businesses in communities as a means of sustainable income generating mechanism. This will provide a dual-benefit for the society-an income generation activity using waste as a raw material.